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SOUTHERN ILLINOIS UNIVERSITY OF CARBONDALE PROJECT UPWARD BOUND:
AN ASSESSMENT OF THE MATH AND SCIENCE SUMMER COMPONENT

By

Robin Thomas

Research Paper

Submitted in partial fulfillment of the requirements for
the degree of Masters in Public Administration in the Graduate School of
Southern Illinois University

Graduate School

Southern Illinois University Carbondale

May 2015

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RESEARCH PAPER APPROVAL

SOUTHERN ILLINOIS UNIVERSITY CARBONDALE PROJECT PROGRAM UPWARD
BOUND: AN ASSESMNT OF THE MATH AND SCIENCE COMPONENT

By

ROBIN THOMAS

A Research Paper Submitted in Partial
Fulfillment of the Requirements
for the Degree of
Master of Public Administration
in the field of Political Science

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TABLE OF CONTENTS

List of Tables	V
Problem Statement.....	1
Literature Review	
Program Description	4
Program Effectiveness (National and Rural)	5
Math and Science Levels of Disadvantaged Students	11
Methodology	13
Findings.....	16
Limitations.....	23
Future Research.....	23
Recommendations.....	24
Conclusions.....	24
References	25
Vita.....	27

LIST OF TABLES

TABLE	PAGE
Table 1	17
Table 2	18
Table 3	19
Table 4	20
Table 5	21

Problem Statement

Project Upward Bound is a federally funded program established in 1964 by President Lyndon B. Johnson as a strategy for the War on Poverty (Dansby and Giles, 2011). The program began as an experimental program aimed to increase access to higher education and retention among students in underrepresented populations (Dansby and Giles, 2011). The goal was to generate the motivation and skills necessary for participants to successfully complete high school and enter and complete college (Dansby and Giles, 2011). Eligible participants included students from low-income families and potential first generation college students (Dansby and Giles, 2011). For over 30 years, Upward Bound has been in operation, but in recent years the program has come up against funding battles. All Project Upward Bound programs are funded through competitive grants and application process. The lack of funding for Upward Bound has not only had an effect on the program's ability to operate but most importantly on the participants it serves (Dansby and Giles 2011).

In 2002, the Upward Bound program faced a fierce battle for federal funds and scrutiny from the Bush Administration (Morgan, 2002). The Bush Administration considered the program to be ineffective, based on a three-year study that found the Upward Bound program having no effect on the college-going rates of its roughly 57,000 participants (Morgan, 2002). Bush proposed holding funds for Upward Bound at 296.6 million, with no increase for inflation (Morgan, 2002). Despite some education departments officials describing the program as being ineffective, some seem supportive (Morgan, 2002). One deputy assistant secretary considered himself a "strong advocate for standards and accountability." (Morgan, 2002, p.1) The deputy also worked hand in

hand with Upward Bound as the vice president for student affairs at Virginia Union University (Morgan, 2002).

Again in 2006, President Bush provided zero funds for the Upward Bound program in his proposed budget (Schott, 2006). Fortunately, congress restored funding in 2002 and 2006 (Schott, 2006). One U.S Representative stated, “President Bush and his administration, for some reason, have declared war on education programs that assist low-to middle-income students” (Schott, 2006 p.1).

In fiscal years 2007 and 2008, 951 projects were funded serving 65,336 students. But in fiscal year 2012, only 826 projects were awarded to serve 62,576 participants (Department of Education, 2013). The Upward Bound program had lost over 15 percent of its funds (Department of Education, 2013). Also, in fiscal year 2012 the College Cost Reduction and Access Act expired and was not renewed (Department of Education, 2013). The act provided \$57 million in mandatory funds (Department of Education, 2013). This resulted in Upward Bound receiving \$26.6 million less funding than in fiscal year 2010 (Department of Education, 2013). Many Upward Bound programs, despite the funding loss, were able to hold on to 62,576 participants by encouraging greater productivity and new funding strategies. (Department of Education, 2013).

Funding cuts have affected many programs and participants throughout the United States of America. In 2011, an Upward Bound program director at Eastern New Mexico University (ENMU) described his worries over possible funding cuts (Duncan, 2011). He stated, “with the national leaders struggling with the budget, one in four upward bound programs could be cut” (Duncan, 2011, p.1). According to the article (2011), congress has the option to pass a continuing resolution to keep Upward Bound operating for another year, but there is no

guarantee this will happen; if it did, the program would be in jeopardy again in 2012 (p.1). The ENMU Upward bound program has been open to serve students in New Mexico counties such as Portalales, Clovis, Dora, Elida, Floyd, Texico, and Melrose (Duncan, 2011). Two ENMU participants gave their opinion of the program. Upward Bound participant Jessica Bryan, 16, said that “through the program she’d learned what she needed to do to get into college and her math, science, and English work improved. It gives you hope” (Duncan, 2011, p.2). Another participant of the program, Zachary Martinez, 17, stated that “he participated in Upward Bound because he thought it was a good opportunity to help him get into college. Not only has it provided information, but it taught him that he could go to college, no matter his background, if he puts his mind to it” (Duncan, 2011, p.2).

In 2012, Illinois Central College (ICC) Upward Bound program for the first time in 20 years lost \$280,000 in federal grant money for operation (Adams, 2012). In 2012, ICC was forced to cancel its signature six-week summer college-preparatory program for high school students, which had served about 80 students in both summer and after-school programs (Adams, 2012). ICC’s executive director of diversity stated that “It wasn’t based upon the lack of performance or productivity; unfortunately, we got caught in the budget situation” (Adams, 2012, p.1). According to the article, more restrictive requirements resulted in the loss of funding for more than 200 programs around the nation, including 13 in Illinois (Adams, 2012). The director also added, “It’s unfortunate the kids suffer and the community suffers. We need more programs like this more than ever” (Adams, 2012, p.1).

Funding is needed to keep upward bound programs alive, especially for programs with majority of its participants are low-income and first generational. Project Upward Bound Carbondale is one of those programs. Without funding and a Project Upward Bound Carbondale being in

operation students would lose out on the opportunity to have help and support in achieving an education after high school as well an opportunity to achieve better grades in school.

At the end of this report, it is intended that the results be able to benefit the Project Upward Bound program here in Carbondale, IL. The purpose of this report is to show if Project Upward Bound Carbondale is effective in increasing the knowledge of students who participate in the program, specifically in the subjects of math and science. By showing effectiveness, policymakers are able to see the need for adequate funding for this program. The following research questions will be addressed:

1. Is the Project Upward Bound Carbondale effective in increasing students' knowledge of science and introducing students to concepts in higher level science courses that they will be taking during the next academic year?
2. Is the Project Upward Bound Carbondale effective in increasing students' knowledge of math and introducing students to concepts in higher level math courses that they will be taking during the next academic year?

Literature Review

Program Description

Project Upward Bound serves high school students, ages 13-19, from low-income families and those with families in which neither parent holds a bachelor's degree. The student must also have a need for academic support to pursue a program of post-secondary education (Upward Bound Program, 2013). The goal of Upward Bound is to increase the rate at which participants complete secondary education and enroll in and graduate from institutions of

postsecondary education (Upward Bound Program, 2013). Upward Bound projects must provide academic instruction in subjects such as mathematics, laboratory sciences, composition, literature, and foreign languages (Upward Bound Program, 2013). They must also provide information on federal student financial aid programs and benefits, and guidance and assistance on secondary school reentry, as well as entry into general educational development programs or postsecondary education (Upward Bound Program, 2013). The Upward Bound Program offers tutoring, counseling, mentoring, and work-study programs.

In order for a project to operate, two-thirds of its participants must be both low-income and potential first-generation students (Upward Bound Program, 2013). The remaining one-third must be either low-income, first-generation college students, or students who have a high risk for academic failure (Upward Bound Program, 2013).

Summer Component

During the summer, students spend six weeks on a university campus, housed at that university's residence halls. The students attend classes (Literature, Mathematics, Composition, Science, and Spanish) from 8:00 a.m. to 12:00 p.m. Monday through Friday. Afternoons are devoted to work study, computers, study skills, career development, personal development, and recreational activities. In the evenings, the students study for hours in the residence hall, where their tutor/counselors help them with homework and maintain discipline. On weekends, students return home.

Program Effectiveness

As stated earlier, Upward Bound is a federally funded program, and as such, many evaluations have been conducted to determine its effectiveness on participants (Law, 1999). Project Upward Bound has been evaluated from both an effectiveness approach and an impact

approach (Law, 1999). Some evaluations were conducted to determine its effect on students' academic achievement and performance while others measured success by analyzing the number of participants who graduated from high school and the number of participants who entered post-secondary education institutions (Law, 1999). With federal programs having very tight and strict budgets, policymakers want to make sure that they are funding programs that will have the greatest impact, as well as data to support their decisions to fund a program (Coverdale, 2009).

One of the first Upward Bound effectiveness evaluations was conducted in 1966 by the Greenleigh Associates. When this evaluation was conducted a pilot program had just found the program to be effective on participants, with 90% of the students' entering a four year college or university. (Coverdale, 2009) After that, in 1966 200 colleges and universities were sponsoring Upward Bound chapters, serving nearly 19,000 students (Coverdale, 2009). The \$1500.00 per student cost needed for the program was a matter of concern to the funders, so it was decided that a federal study needed to be conducted to determine if the program was having an impact on participants or not (Coverdale, 2009). The study (2009) results revealed first that there was a significant increase in the high school retention rate of low income students compared with students enrolled in high school before Upward Bound was available: 93% as opposed to 69%. Second, it revealed a higher post-secondary enrollment rate: 67% of low-income students who participated in Upward Bound were enrolling in post-secondary education as opposed to the national enrollment rate of 20% for low-income students (p.12) A cost-benefit analysis that was conducted at that time showed the economic benefits for the Upward Bound students exceeding the cost three to one (Coverdale, 2009).

National

The Upward Bound program was first nationally evaluated in 1973 by the Research Triangle Institute (RTI) (Armesto, 1998). The RTI report found that the program was effective in meeting the stated goals (Brown, 2008). The study revealed that Upward Bound programs had an impact on participants' educational aspirations, postsecondary education progress, and persistence (Brown, 2008). The RTI collected data through mail surveys, questionnaires, telephone interviews, and student transcripts (Brown, 2008). The students that the program had the most impact on were those who had regularly attended the program. (Armesto, 2008). Students who regularly participated generally exhibited more positive outcomes than those who did not (Armesto, 1998).

In the late 1990s, a second national study was conducted by Mathematica Policy Research, Inc. The purpose of the study was to report changes that had occurred to the Upward Bound program since the previous national evaluation and to determine whether or not it was still effective (Coverdale, 2009). The results were mixed concerning Upward Bound's effectiveness (Armesto 1998). The MPR investigations found that the program had no effect on participants' high school academic preparations or grades, as well as no effect on their persistence to college (Armesto, 1998). On the other hand the study found that the program had a positive effect on its participants' overall educational attainment and on students' college enrollment (Armesto, 1998). The MPR study's findings of Upward Bound were based on data from more than 2,800 students in their first and second year of high school (Armesto, 1998). The study found that many students who enrolled in Upward Bound remained for only a short while (Coverdale, 2009). Also, the findings stated that "the typical participant was exposed to

Upward Bound for only 19 months, and remained commonly in the program for one summer and parts of two academic years as well as Upward Bound having a limited impact on students during high school”(Coverdale, 2009, p.14). According to a report conducted by Myers and Schirm “less than one third of Upward Bound participants were male in 1992” (Coverdale, 2009, p.31).According to the study, students were expected by the researchers to earn more credits of math and science than students not in Upward Bound (Coverdale, 2009). The study revealed that there was not a significant impact on in-school behavior, grade point average, or credits earned (Coverdale, 2009). The study also revealed that younger students were more likely to participate than older students due to older students looking for employment. Students that participated regularly were of not old enough to work at the time they entered the program (Armesto, 1998).

Project Upward Bound in Rural Areas

Project Upward Bound Carbondale serves students in rural areas. These schools include Cairo Junior Senior High School, Egyptian High School, Meridian High School, Century High School, and Carbondale High School. According to the United States Bureau of the Census, in 1993, 88.9% of rural youth completed high school, a substantial improvement over the 83.2% completion rate in 1975 (Grimard and Maddaus, 2004, p.31) The Census Bureau also reported that by 1993, rural adolescents were as likely as adolescents from metropolitan areas to graduate from high school; whereas in 1975, adolescents in metropolitan area central cities were slightly more likely to graduate from high school than adolescents from rural (nonmetropolitan) areas (Grimard and Maddaus, 2004, p.31) In 2000, a follow up survey was conducted of an 8th grade cohort of 1988. (Grimard and Maddaus, 2004). The survey revealed that 12 years later 89.7% of participants who attended 8th grade in rural areas had graduated from high school or received a

General Equivalency Diploma (GED), compared to 92.5% of urban participants and 93.1% of suburban participants (Grimard and Maddaus, 2004, p. 31).

Research studies of college attendance rates show that there is a growing statistical gap in rural youth going to college compared to youth from metropolitan areas (Grimard and Maddaus, 2004). Studies indicate that rural youth are less likely to attend college than youth from metropolitan areas. According to Grimard and Maddaus (2004), a study conducted by Herzog and Pittman in 1999 reported that the gap between rural and metropolitan areas in the percentage of the population that has completed a bachelor's degree or beyond grew from 3.4% in 1960 to 9.5% in 1990. It was quoted in the article that too often, because of the economic despair in many small towns, school is seen as the way either to prepare students to leave their community for employment somewhere else or to remain in their own town only to live on the fringes of society (p. 36).

Grimard and Maddaus found that for those who chose the former option, postsecondary education may be the first stop on the road out of rural life (Grimard and Maddaus, 2004, p.32). But for those students who wish to remain or return to live in rural communities, secondary education is essential for future employment opportunities and for the chance to pursue postsecondary education Grimard and Maddaus (2004, p.32). The author states that small-town schools do not provide students with skills to manage their lives successfully in other communities, nor do they provide options for students to engage as productive persons in the development of their own communities (Grimard and Maddaus , 2004, p. 32). Research indicates that rural adolescents are more likely to live in families whose incomes are below the poverty line, and to have parents who did not complete high school, than adolescents in

metropolitan areas, based on data from the 1990 United States Census (Grimard and Maddaus, 2004, p.32).

In 2004, an evaluation was conducted on a rural Upward Bound program at Maine University. The study revealed that once students in rural areas enrolled in the Project Upward Bound program, they began to benefit academically, financially, and socially (Grimard and Maddaus, 2004). The retention rate at Maine University is significantly higher than the national retention rate reported by Mathematica Policy Research, Inc. (Grimard and Maddaus, 2004). The evaluation had shown the Upward Bound program at Maine University to have a positive impact on college attendance rates in Maine (Grimard and Maddaus, 2004). Maine is a predominantly rural state with only one large/major city, Portland (Grimard and Maddaus, 2004). Guidance counselors were surveyed regarding college attendance for Upward Bound students who graduated from high school the previous spring, with comparisons to a random sample of other graduates from the same high schools that year that had not attended Upward Bound programs (Grimard and Maddaus, 2004). The data collected were surveys and interviews of students, guidance counselors, and parents or guardians of students (Grimard and Maddaus 2004). The issues explored within the surveys and interviews were related to recruitment and retention. They also explored the impacts of the Upward Bound program at the University of Maine (Grimard and Maddaus 2004).

There were four Upward Bound sites in Maine serving students from a total of 78 high schools (Grimard and Maddaus, 2004). All of the Upward Bound programs participated in the study, almost all of which were located in rural areas (Grimard and Maddaus, 2004). Grimard and Maddaus (2004) found in the report the following results: the four-year college attendance rate was 82.4%, for two-year colleges it was 5.9%. For the random sample of all other high

school students (including some with middle to high incomes), the attendance rate at four-year colleges was 40.4%, and at two-year colleges, 15.1%. For the random sample's sub-group of low-income students whose parents had not completed a four-year college degree, the four-year college attendance rate was 25.2%, and at two-year colleges it was 14.8% (p.34). It was also revealed in the finding that Upward Bound graduates were almost twice as likely as graduates in a random sample of their peers to attend four-year colleges, and three times as likely to attend four-year colleges as their peers from comparable family backgrounds (Grimard and Maddaus, 2004).

In 2002, a PHD student from Virginia did a comparative analysis of students' success by project level characteristics in the Upward Bound Project. He collected his data from a nationally representative sample of students who applied to the Upward Bound program between 1992 and 1994. (Le, 2002) The students were either from rural areas, suburban areas, or metropolitan areas. The study first revealed that projects that were from rural areas had a smaller student staff ratio and about 10.5 students per staff member (Le, 2002). In comparison, projects per staff member compared to suburban and metropolitan area Upward Bound project tended to have larger student to staff ratio averaging 15.5 and 14.7 (Le, 2002). Secondly, the study revealed that 70% of students in rural programs graduated from high school compared to 60% from programs in other areas (Le, 2002). Students participating Upward Bound projects located in metropolitan areas had a slightly lower GPA than those in suburban and rural areas (Le, 2002). The study also revealed that in metropolitan areas the dropout rate for upward bound students was 3% compared to 6% of projects in rural areas (Le, 2002).

Math and Science Levels of Disadvantaged Students

Relatively low levels of academic achievement in math and science among economically disadvantaged youth have many policy makers concerned (Seftor and Calcagno, 2010). Policy

makers are also concerned about the underrepresentation of disadvantaged college students in math and science. According to national statistics , while racial gaps in math and science test scores narrowed somewhat in the 1970's and 1980's, substantial gaps persisted through the 1990's to the present (Seftor and Calcagno, 2010).

According to a study conducted by the U.S Department of Education in 1994, only 58 percent of black high school graduates had completed geometry while in high school, compared with 73 percent of white high school graduates. In the same year, only 13 percent of black and hispanic graduates had completed the common triad of science courses—biology, chemistry, and physics—compared with 23 percent of white graduates (Seftor and Calcagno, 2010, p.1).

The U.S Department of Education stated that minority college students were less likely to take math and science courses or earn a degree in math or science (Seftor and Calcagno 2010). The Department of Education revealed that ten percent of black college students and 14 percent of hispanic college students received credit for calculus or advanced math courses in the late 1980's, compared with 22 percent of white college students (Seftor and Calcagno, 2010). Sixteen percent of black college students and 21 percent of Hispanic college students earned course credits in chemistry, compared with 27 percent of white college students, additionally 8 percent of black students and 11 percent of hispanic students earned college credit for physics, compared with 18 percent of white students (Seftor and Calcagno, 2010, p.1). Because minority students earned fewer college credits in math and science (biological sciences and life sciences, computer and information sciences, engineering, engineering-related technologies, mathematics, and physical sciences and science technologies) than white students, it is not surprising that they were less likely to earn degrees in those subjects (Seftor and Calcagno 2010, p.1). Black students earned 7 percent of all bachelor's degrees in 1995–96, including just 7 percent of all bachelor's

degrees in math and science fields. In the same year, hispanic students earned 5 percent of all bachelor's degrees, but just 4 percent of all bachelor's degrees in math and science. (Seftor and Calcagno, 2010 p.1)

Methodology

The purpose of this study was to determine the effectiveness of the Project Upward Bound Carbondale math and science component. This section discusses the measurement of all variables described, followed by a discussion of the procedure, i.e., how the information was gathered, analyzed, and interpreted.

Population/Sample

The data from this study was collected from program files in the Project Upward Bound office housed at Southern Illinois University Carbondale. In particular, this study focused on students that participated in the summer program from 2009-2012. Each student in the program is considered low income and first generation. There was a total number of 328 students who were assessed in this evaluation.

Variables

Variables collected from the program files included gender, year, scores on pre/posttest, courses, and school. These variables will be used in determining whether or not the project Carbondale Upward Bound program is effective.

Gender

To determine whether females or males participated more, gender was investigated. Gender was coded as 1=Male and 2=Female.

Year

This study analyzed data over a four- year period. The years were coded as follows:

1=2009, 2= 2010, 3=2011, and 4=2012

Pretest and Posttest

The Project Upward Bound program uses an evaluation method to determine effectiveness. Pre- and post-test teacher-made instruments are used to assess students' knowledge and improvement with terminology and math/science concepts provided in summer course content. If a class of students scored 75 percent or higher on the post test, the objective was met. If not, the objective was not met. The following scores were recorded as 1=0-59 (Failed), 2=60-69, (D Average) 3=70-79 (C Average), 4=80-89 (B Average), and 5=90-100 (A average).

Courses

During the summer program, students are placed in classes that they will be enrolled in the next academic school year.

They are coded as follows: 1= Biology, 2=Chemistry, 3=Physical Science, 4=Algebra I, 5=Algebra II, 6 =Advanced Math, and 7=Geometry.

School

There are 6 schools that participate in the Upward Bound Carbondale Program

They are coded as follows: 1= Cairo, 2=Egyptian, 3=Meridian, 4=Murphysboro, 5= Carbondale, and 6= Century.

Goals and Objectives

Each grant year, the directors of the Upward Bound programs nationwide develop new goals and objectives. Below are the objectives and goals developed by the Upward Bound Director during the 2009-2012 year summer program.

Goal 1: To improve students' current math skills and to introduce students to terminology, concepts, and functions of higher level math courses that students will be taking the next academic year.

Objectives

-Seventy-five percent of the Algebra I students will demonstrate understanding and improvement with order of operations when using addition, subtraction, multiplication, and division, as well as solving word problems with equations and factoring and using percentage ratio's

-Seventy -five percent of the Algebra II students will demonstrate understanding and improvement in abilities to work with absolute values, negative exponents, polynomials, linear equations, word problems, and graphing.

-Seventy-five percent of the Geometry students will demonstrate understanding and improvement in abilities to work with the Pythagorean Theorem, properties of symmetry, congruence, and similarity, using two and three-dimensional figures, and working proofs and theorems.

-Seventy- five percent of the students in Advanced Math (Pre-Calculus) will demonstrate understanding and improvement in abilities with polynomials, logarithms, graphing, algorithms, trigonometry functions, using quadratic formulas, and basic procedures in data analysis.

Goal 2: To improve students' current science skills and to introduce students to terminology, concepts, and functions of higher level science courses that students will be taking the next academic year.

Objectives

Seventy- five percent of the Biology students will demonstrate increased knowledge of terminology and concepts of the scientific method and measurements used in science; functions

existing at the level of cell life in plants and animals; and the functions of higher level body systems, including the nervous, skeletal, muscular, sensory, and reproductive systems.

Seventy-five percent of the Chemistry students will demonstrate increased knowledge of terminology and concepts of basic principles of chemistry, molecules, matter and states of matter, and chemical properties; working with graphs and tables, metric systems, and measurement scales; and identifying hypotheses and experiential designs.

Seventy-five percent of the Advanced Science (Physical Science) students will demonstrate increased knowledge of terminology and concepts concerning forms of energy, motion, sound, light, and electricity in physics; medical preparation; and the scientific method using metric systems and operations with tables and graphs, hypotheses, and experimental data.

Results/Findings Connection

After analyzing the data collected from the Carbondale Upward Bound program, the research revealed answers to the research questions stated earlier. The data led to the following conclusions for each research question:

1. Is the Project Upward Bound Carbondale effective in increasing students' knowledge of science and introducing students to concepts in higher level science courses that they will be taking during the next academic year?
2. Is the Project Upward Bound Carbondale effective in increasing students' knowledge of math and introducing students to concepts in higher level math courses that they will be taking during the next academic year?

Table 1. 2009 Pre and Post Test Scores

Pretest Scores	100-90	89-80	79-70	69-60	59-Below	N of Students	Objective Met
Biology			6%		94%	16	
Chemistry					100%	10	
Physical Science					100%	13	
Algebra I			14%		86%	7	
Algebra II					100%	9	
Advanced Math					100%	11	
Geometry					100%	11	
Total						77	
Posttest Scores							
Biology	38%	12%	25%	6%	19%		Yes
Chemistry		40%	30%	30%			Yes
Physical Science	23%	15%	23%	31%	8%		Yes
Algebra I	29%	29%	28%		14%		Yes
Algebra II	22%	11%	22%		45%		No
Advanced Math	9%	46%	18%		27%		No
Geometry	64%	9%	9%	9%	9%		Yes

Table 1 shows the pre and posttest grades of student who participated in the summer of 2009 Project Upward Bound program. In summer 2009, more than half of students failed their pre-test exam. Only 6 % of student scored between a 79-70 in Biology and only 14% of students scored between the 79-70 range in Algebra I. When looking at the posttest scores students significantly increased their scores. For example, in Chemistry 100% of students failed their pretest exam. When students retok the exam 40% of students scored between the ranges of 89-90, 30% between 79-70, and 30% between 69-60. The entire Chemistry class increased their knowledge of the subject. The table also shows that 5 out of the 7 subjects met their objectives. This means that 5 out the 7 classes met their objective of 75% of students increasing their knowledge

in the math and science classes. These findings are opposite of what the MRI findings suggest. The MPR investigations found that the program had no effect on participants' high school academic preparations or grades. (Armesto, 1998). There was a total number 77 students that were enrolled in the math and science classes during the 2009 summer program.

Table 2. Year 2010 Pre and Post Test Scores

Pretest Scores	100-90	89-80	79-70	69-60	59-Below	N of students	Objective Met
Biology					100%	18	
Chemistry					100%	13	
Physical Science					100%	12	
Algebra I				10%	90%	10	
Algebra II					100%	15	
Advanced Math					100%	10	
Geometry					100%	11	
Total						89	
Posttest Scores							
Biology	5%	28%	17%	11%	39%		No
Chemistry	8%	15%	23%	23%	31%		No
Physical Science	8%	25%	25%	17%	25%		Yes
Algebra I	50%	30%	10%	10%			Yes
Algebra II	60%	13%	13%	14%			Yes
Advanced Math	30%	30%	30%	10%			Yes
Geometry	18%	37%	27%	18%			Yes

Table 2 shows the pre and posttest grades of student who participated in the summer of 2010 Project Upward Bound program. In summer 2010, more than half of students failed their pre-test exam. Only 10% of student scored between a 69-60 in Algebra I. When looking at the posttest scores there was a high increase. For example, in Geometry 100% of students failed their pretest exam. When students retake the exam 18% of students scored between the ranges of 90-100, 37% between 89-80, 27% between 79-70 and 18% between 69 and 60. The entire Geometry

class increased their knowledge of the subject. The table also shows that 5 out of the 7 subjects met their objectives. This means that 5 out the 7 classes met their objective of 75% of students increasing their knowledge in the math and science classes. Again, these finding are opposite of what the MRI finding suggest. The MPR investigations found that the program had no effect on participants' high school academic preparations or grades. (Armesto, 1998). There was a total number 89 students that were enrolled in the math and science classes during the 2010 summer program.

Table 3. Year 2011 Pre and Post Test Scores

Pretest Scores	100-90	89-80	79-70	69-60	59-Below	Number of Students	Objective Met
Biology					100%	17	
Chemistry					100%	14	
Physical Science					100%	8	
Algebra I		10%			90%	10	
Algebra II					100%	13	
Advanced Math					100%	9	
Geometry					100%	10	
Total						81	
Posttest Scores							
Biology	100%						Yes
Chemistry	100%						Yes
Physical Science	100%						Yes
Algebra I	30%	30%	30%		10%		Yes
Algebra II	54%	8%	23%	8%	7%		Yes
Advanced Math	33%	45%		11%	11%		Yes
Geometry	50%	30%	10%	10%			Yes

Table 3 shows the pre and posttest grades of student who participated in the summer of 2011 Project Upward Bound Program Carbondale. In summer 2011, more than half of students failed their pre-test exam. Only 10 % of student scored between a range of 89-80 in Algebra I. When

looking at the posttest scores students significantly increased their scores. For example, in Physical Science 100% of students failed their pretest exam. When students retook the exam the entire class scored between the ranges of 90-100. The entire class increased their knowledge of the subject. The table also shows that all of the subjects met their objectives for the 2011 summer. This means that each class met their objective of 75% of students increasing their knowledge in the math and science classes. These findings are consistent with the Research Triangle Institute report. The Institute found that program was effective in meeting the stated goals (Brown, 2008). There was a total number 81 students that were enrolled in the math and science classes during the 2011 summer program.

Table 4. Year 2012 Pre and Post Test Scores

Pretest Scores	100-90	89-80	79-70	69-60	59-Below	N of students	Objective Met
Biology					100%	16	
Chemistry					100%	16	
Physical Science					100%	10	
Algebra I					100%	11	
Algebra II					100%	15	
Advanced Math					100%	7	
Geometry					100%	6	
Total						81	
Posttest Scores							
Biology	13%	6%	25%	25%	31%		No
Chemistry	6%	19%	31%		44%		No
Physical Science	10%	10%	10%	20%	50%		No
Algebra I	27%	37%	9%	9%	18%		Yes
Algebra II	34%	27%	13%	13%	13%		Yes
Advanced Math	72%	14%	14%				Yes
Geometry	33%	33%	34%				Yes

Table 4 shows the pre and posttest grades of student who participated in the summer of 2012

Project Upward Bound Program Carbondale. In summer 2012, the entire class of students failed

their pre-test exam. When looking at the posttest scores students significantly increased their scores. For example, in Geometry 100% of students failed their pretest exam. When students retook the exam 33% of students scored between the ranges of 90-100, 33% between 89-80, and 34% between 79-70. The entire Geometry class increased their knowledge of the subject. The table also shows that 4 out of the 7 subjects met their objectives. This means that 4 out the 7 classes met their objective of 75% of students increasing their knowledge in the math and science classes. These finding are inconsistent with the Research Triangle Institute report. The Institute found that program was effective in meeting the stated goals (Brown, 2008). In the findings above only 4 subjects met their objectives. There was a total number 81 students that were enrolled in the math and science classes during the 2009 summer program.

Table 5. Years 2009-2012 Project Upward Bound Gender Participation

Year	2009	2010	2011	2012
Females	45.5%	59.6%	75.3%	71.6%
Males	54.5%	40.4%	24.7%	28.4%

Table 5 shows that over a 4 year period, there was a significantly higher participation rate of females compared to males. For example, in 2011 75.3% of participants were females compared to 24.7% males. Table 5 also shows that in 2012 71.6% of participants were females compared to 28.4% of males. The only year that males outnumbered females in participations was in 2009. In 2009 male participation was 54.5% compared to females at 45.5%. According to Myers and Schirm, less than one third of Upward Bound participants were male in 1992.

Overall, the program evaluation results were not clear in determining if the program is effective. This evaluation was consistent with the findings of the MPR investigations. On one hand, the Upward Bound program was able meet certain program objectives; however, it was not

able to support other program objectives. This study was able to support similar evaluations stating that the Upward Bound program was effective in some areas and not in others. The Mathematica Policy Research Institute results came to a mixed conclusion about Upward Bound's effectiveness (Armesto, 1998). The MPR investigations found that the program had no effect on participants' high school academic preparations or grades, as well as no effect on their persistence to college (Armesto, 1998). On the other hand the study found that the program had a positive effect on its participants overall educational attainment and on students' college enrollment (Armesto, 1998).

The findings showed that in each year more than half of the objectives were met in between both courses. For example in 2009, 2010, and 2011 at least 5 out of the 7 objectives were met. In 2012, only 4 out of 7 of the objectives were met. The findings showed that Biology and Chemistry were the two subject courses that had a hard time meeting objectives. Both in years 2010 and 2012 seventy five percent of students did not increase their knowledge of the subjects. Also, the study showed that Algebra I was one of the subjects that students did have knowledge in when coming into the program. In years 2009, 14% of students scored between 79-70 on their pretest exam. In 2010 10% of students scored between the ranges of 69-60. In 2011, 10% of students scored between 89-80 on their Algebra I pretest exams. Project Upward Bound Carbondale was not able to meet every objective every year, but show significant increase in test scores and knowledge among students. The findings were inconsistent with the findings of the RTI report except for in one year. The RTI reported Project Upward Bound was successful in meeting its stated goals. (Brown, 2008) In year 2011, all objective were met opposed to objectives not met in years 2009, 2010, and 2010.

Limitations

This study had several limitations. First of all it was limited by a small sample size of 328 students. The results included only those students that participated in the 2009-2012 summer session. Pre- and posttest scores were only used to determine effectiveness. There was no comparison group to determine if those who did not participate in the study had better scores in Math and Science. Also, there was no comparison among different variables such as race, schools, and final grades.

Since students were not identified there was no follow- up to see if the class actually had an effect on students in their math and science classes during the school year. This evaluation also was conducted on one local program, leaving no comparisons to pre- and posttest scores of different upward bound programs locally and nationally.

Future Research

For future research instead of a quantitative study, a mixed method should be conducted with qualitative data gathered through interviews or focus groups. The qualitative data would provide additional information to support quantitative data used to help determine effectiveness, as well as give more insight of how the program affected the participants.

It is also recommended that there be further follow-up to see if students' grades actually improved in their high school math and science classes. One could look at transcripts or monitoring students' grades in math and science to see if there was an improvement. Also, for future research rather, than evaluating pre and posttest scores, other variables such race and schools would be evaluated.

Recommendations

Based on the data collected from the Southern Illinois University Project Upward Bound Program, it is recommended that there be a continued evaluation of the Upward Bound summer program as a whole. A continued evaluation would give the program director a better understanding of why program objectives are not being met and an opportunity to improve them.

Another recommendation would be to implement an Upward Bound Math and Science program. Implementing an Upward Bound Math and Science program will not only help students improve in their math and science classes but also encourage students to obtain math and science degrees once they enter college.

Conclusion

In conclusion, this study had mixed reviews, making it complicated to measure the true effectiveness of Upward Bound Carbondale. The program was inconsistent at achieving its program objectives. The results varied for each subject and year. Even with inconsistent results, the students regularly improved their scores from the pre to post test, proving that the program itself can be extremely effective. However, the objectives are nearly impossible to reach every single time. Transitioning a group of 100% failing students to 75% passing students is a challenge and maybe even a little farfetched. Hopefully the results of this study will encourage similar studies to be conducted that will eventually provide enough supporting evidence that Upward Bound is not only effective in increasing the knowledge of students who participate in the program, but also that adequate funding can be allocated so that programs will have enough money to operate.

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